

Appendix B - Applicants' Analysis of Conservation as an Alternative to the Construction of the Arrowhead - Weston Transmission Line

History of Reliability Problems

During Spring/Summer of 1997, interruptible customer load was shed several times, but firm service was not interrupted. Unique circumstances caused numerous nuclear power plants in Wisconsin and Illinois to be out of service. Bringing in unusually large quantities of substitute power from outside stressed the transmission system, which was never designed to handle such conditions. Folks began to get concerned about the possible lack of generation and transmission affecting electric service. On June 11, 1997, the effects of the outage of a key transmission line prompted concerns about the reliability of service to electric customers in the region.

On June 25, 1998, several Midwestern States and Canadian Provinces came perilously close to a large-scale, regional blackout. This severe disturbance knocked out electric power to a number of industrial customers throughout Northeastern Minnesota and all customers in Northwestern Ontario. If not for extraordinary operating measures and a good deal of luck, all of Minnesota, Wisconsin, North Dakota, South Dakota, Manitoba, and Ontario would have gone dark.

The system is operating too close to the edge. New parallel lines are needed to keep the lights on. The near disaster in June 1998 was precipitated by the loss of the King-Eau Claire 345-kilovolt transmission line which is the only major line running from Minnesota east into Wisconsin. This gap in the regional grid leaves the entire Upper Midwest vulnerable to blackouts.

Purpose of the Line

The Wausau-Duluth transmission line is required to strengthen the power grid and help reduce the electric system's vulnerability to disturbances caused by outages of operating units, maintenance outages, and overload conditions.

Targeted Area Planning Objectives and Screening Criteria

A collaborative committee was convened in 1994 to investigate ways to defer or eliminate proposed transmission projects and developed screening criteria to assess which transmission projects may be amenable to Targeted Area Planning (TAP) solutions. Screening criteria included such things as timing, whether need was due to load growth and the rate of load growth, the geographic area to be addressed, environmental concerns and other factors.

Timing

The timing of the system determines the viability of TAP solutions. This project is needed for the reliability of the electric system by the year 2003. Table 5 within Section 3.6.2 of the Arrowhead – Weston Transmission Line Project application shows that beyond the year 2000, at least 750 MW of perfectly available generation capacity is required to maintain the 0.1 days/year reliability criterion. Perfectly available generation capacity is analogous to a reduction in demand. Given the magnitude of the demand reduction that would be needed (750 MW, or 187.5 MW of sustainable reductions per year and no new load growth), conservation is not a viable alternative to the transmission interface expansion project.

Need type

The need for additional transmission interface capacity is driven by load growth, increased commercial activity in the energy market, operational limitations of the existing interface, and the need for greater bulk power transfer capability to maintain reliability. The TAP Collaborative concurred that projects driven by bulk loads are probably not TAP amenable. The TAP Collaborative defined a bulk load as "any sudden or contingent appearance of a load or generator greater than 30 MW". This conservation project requires load relief of at least 750 MW by the year 2003.

Need location

Within Wisconsin, the Arrowhead-Weston Transmission Project project is required to maintain electric service reliability to 49 counties in the eastern part of the state, encompassing multiple service territories and providers. Furthermore, the Arrowhead-Weston project is required to restore adequate reliability and operating margins within a geographical region that encompasses several states. The ability to achieve the required annual demand reductions, within the time frame needed, on a coordinated basis, is severely compromised by the very large and diverse geographic area. DSM alternatives, requiring significant time to modify customer habits that ultimately lead to an ultimate reduction in demand in very defined customer groups, are not viable tools to address regional reliability and operational issues.

Generation-type alternatives and their location as a means to defer this line are discussed in Section 3.7 of the Arrowhead-Weston CPCN Application (PSCW docket 05-CE-113). The

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conclusion is that distributed generation options would not alleviate the need conditions. The viability of renewable-type options are discussed in Section 3.8 of the same application.

Environment

Environmental concerns of this project are being addressed. See Appendix A of the Arrowhead-Weston CPCN Application.

Other factors

There are no other factors that increase TAP opportunities in this project.

Conclusion

The screening criteria timing, need type and location all indicate the Arrowhead-Weston Transmission Project project is not a project amenable to TAP solutions or that additional conservation within the timeframe needed is a means to defer or eliminate the need for the line. Additional analyses confirm that generation and renewable alternatives will not alleviate the need for transmission interface expansion.

Despite not passing the TAP screening, the cost effectiveness of conservation alternatives was determined with proxy calculations. The following is an approximation of the cost that would be incurred to achieve 750 MW by the year 2003:

Electric DSM 1998 year-end spending

| Conservation, all sectors | \$1,494,788 |
|---------------------------|-------------|
| Load Management | 19,262 |
| Level 4 costs | |
| | \$5,103,070 |

Electric DSM 1998 year-end MW achievement

| Conservation, all sectors | 2.51 |
|---------------------------|------------|
| Load Management | <u>1.6</u> |
| | 4.11 |

Cost per MW is \$1,241,623.

Table B-1 Cost of SDM aternative to Arrowhead-Weston

| Year | MW Needed | Cost | 1999 Present Value* |
|------|-----------|---------------|-----------------------|
| 2000 | 187.5 | \$232,804,313 | \$211,619,121 |
| 2001 | 187.5 | \$232,804,313 | \$192,296,363 |
| 2002 | 187.5 | \$232,804,313 | \$175,905,880 |
| 2003 | 187.5 | \$232,804,313 | \$ <u>159,005,346</u> |
| | | | \$738,826,710 |

^{*}Assumes 10 percent discount rate.

The \$738,826,710 is understated by the following factors:

- a. ramp up of infrastructure costs to achieve the necessary conservation
- b. additional program and incentive costs to induce accelerated DSM

This estimation is not stated in present value revenue requirements (PVRR) terms.

No further assumptions are made that 750 MW of additional DSM exists to provide relief for the line.